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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/712,761

11/12/2003

Kyo Inoue

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7590

09/28/2007

LUMEN INTELLECTUAL PROPERTY SERVICES, INC.  
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EXAMINER

LIPMAN, JACOB

ART UNIT

PAPER NUMBER

2134

MAIL DATE

DELIVERY MODE

09/28/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

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**Office Action Summary**

Application No.

10/712,761

Applicant(s)

INOUE ET AL.

Examiner

Jacob Lipman

Art Unit

2134

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 July 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-9, 12, 15, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Blow, USPN 5,757,912.

With regard to claim 16, Blow discloses a time-phase entanglement photon pair source including a regulated single-photon generator (column 2 lines 54-57) for sequentially generating two photons of a pair (column 2 lines 54-62), wherein the two photons are generated with random relative phase and are separated by a regulated time interval (column 3 lines 21-27) and an optical coupler (column 5 line 56) for coherently splitting each of the two photons into two coherent components directed, respectively, to two receivers (column 6 lines 10-14).

With regard to claim 9, Blow discloses two receivers coupled to the two optical transmission lines (column 9 lines 3-6), wherein each of the receivers comprises and interferometer having two arms with relative optical path difference substantially equal to the time interval, and a pair of single-photon detectors coupled to each interferometer (column 10 lines 10-19).

With regard to claims 1-3, Blow discloses at the two receivers, generating from each component of each photon a coherent superposition of time-shifted states having

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a relative time shift (column 10 lines 1-5), detecting the photons with single-photon detectors and deriving part of a quantum key from detector information and time slot information associated with the detecting (column 10 lines 10-30), the key is jointly determined by the two receivers (column 10 lines).

With regard to claim 4, Blow discloses the receivers have polarization-independent operation (column 10 lines 25-30).

With regard to claim 5-7, Blow discloses the interval is greater than 8 ns (column 5 lines 15-20).

With regard to claims 8 and 12, Blow discloses the regulated single-photon generator comprises a time synchronization pulse transmitter (column 5 line 64).

With regard to claim 15, Blow discloses the detectors comprise InGaAs/InP avalanche photodiodes (column 6 lines 30-35)

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 10, 11, 13, 14, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blow.

With regard to claims 10, 11, 13, 14, 17, and 18, Blow discloses the method of claim 1, as outlined above, but does not go into the specifics of how the photon is generated exactly. In the prior office action the examiner took official notice that using a

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quantum-dot in a micro-cavity and color centers of a diamond and using a wavelength are well known ways to create photons. Since applicant did not traverse the examiner's official notice, it is taken as admitted prior art (MPEP 2144.03). It would have been obvious for one of ordinary skill in the art to use any of these methods when implementing Blow when they are available for the motivation of using existing equipment.

### **Conclusion**

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Lipman whose telephone number is 571-272-3837. The examiner can normally be reached on M-Fr.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kambiz Zand can be reached on 571-272-3811. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JL

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KAMBIZ ZAND  
SUPERVISORY PATENT EXAMINER